CLAIMS

1. A position sensor for sensing the position of an object having an associated magnetic field comprising:

a first magnetic field sensing device at a first position that outputs a first signal related to the magnetic field at the first position;

a second magnetic field sensing device at a second position that outputs a second signal related to the magnetic field at the second position;

a processor to derive from the first signal and the second signal the most likely position of the position sensor relative to the object,

wherein the processor comprises:

a first calibrator to calibrate the first magnetic field sensing device, thereby deriving a first measured magnetic field;

a second calibrator to calibrate the second magnetic field sensing device, thereby deriving a second measured magnetic field;

a mathematical model to determine a predicted magnetic field at a given position relative to the object;

an estimator algorithm to compare the predicted magnetic field with the first and second measured magnetic fields, thereby calculating the most likely position of the position sensor relative to the object.

2. A position sensor as claimed in claim 1 wherein the first calibrator further comprises a correction model.

3. A position sensor according to claim 2 wherein the correction model comprises a gain term and an offset term.

4. A position sensor according to any preceding claim wherein the estimator algorithm comprises an extended Kalman Filter algorithm.

5. A position sensor according to any preceding claim wherein the processor continually derives the most likely position of the position sensor relative to the object in real time.

6. A position sensor according to any preceding claim wherein during operation of the position sensor the object is separated from the position sensor by a wing skin.

7. A position sensor according to any preceding claim wherein, during operation of the first calibrator, the first magnetic field sensing device is at a known position relative to the object and is separated from the object by a wing skin of predetermined thickness.

8. A position sensor according to any preceding claim wherein the object comprises a cylindrical magnetic object.

9. A position sensor as claimed in any preceding claim wherein the magnetic field sensing devices comprise Hall Effect devices.

10. A position sensor according to any preceding claim wherein the estimator comprises a software program.

11. A position sensor according to any preceding claim wherein the first calibrator comprises a software program.

12. A computer program executable to derive the most likely position of a position sensor according to any one of claims 1 to 9 in relation to the magnetic object.

13. A computer programmed to derive the most likely position of a position sensor according to any one of claims 1 to 9 in relation to the magnetic object.

14. A portable device comprising a position sensor according to any of claims 1 to 9.

15. A position sensor substantially as described herein with reference to the accompanying drawings.

16. A method of sensing the position of an object having an associated magnetic field using a position sensor comprising first and second magnetic field sensing devices at first and second positions

the method comprising the steps of:

(a) sensing a first signal related to the magnetic field at the first position from the first magnetic field sensing device;

(b) sensing a second signal related to the magnetic field at the second position from the second magnetic field sensing device;

(c) calibrating the first magnetic field sensing device, thereby deriving a first measured field from the first signal;

(d) calibrating the second magnetic field sensing device, thereby deriving a second measured magnetic field from the second signal;

(e) determining a predicted magnetic field at a given position relative to the object using a mathematical model;

(f) comparing the predicted magnetic field with the first and second measured magnetic fields using an estimator algorithm, thereby calculating the most likely position of the object relative to the position sensor.

17. A method as claimed in claim 16 wherein the step of calibrating the first magnetic field sensing device comprises using a correction model.

18. A method as claimed in claim 17 wherein the correction model comprises a gain term and an offset term.

19. A method as claimed in any of claims 16 - 18 wherein the estimator algorithm comprises an extended Kalman filter algorithm.

20. A method as claimed in any of claims 16 - 19 further comprising continually deriving the most likely position of the position sensor relative to the object in real time.

21. A method substantially as described herein with reference to the accompanying drawings.